

Negative Predictive Value of Transthoracic Core-Needle Biopsy

A Multicenter Study

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BACKGROUND: Specimens collected by CT scan-guided transthoracic core-needle biopsy (TTNB) are frequently used for the diagnosis of lung nodules, but the clinical value of negative results has not been sufficiently investigated. We sought to determine the negative predictive value (NPV) of TTNB specimens and investigate predictive factors of negative results.

METHODS: All consecutive TTNBs performed in three centers between 2006 and 2012 were included. The medical charts of patients with nonmalignant TTNB specimens were reviewed and classified as true or false negatives. Binary logistic regression was used for multivariate analysis.

RESULTS: Overall, findings from 980 TTNB specimens were included. Malignant disease was found in 79% (n = 777) of the cases, nonmalignant disease in 6% (n = 54), and “negative” results in 15% (n = 149). For the diagnosis of malignant disease, NPV was 51%. Estimated sensitivity, specificity, and accuracy were 89%, 99%, and 90%, respectively. The complication rate was 34% (life-threatening complication in 6%). In multivariate analysis, predictive factors for a false-negative result were radiologist experience (adjusted OR [AOR], 0.996; 95% CI, [0.994-0.998]), occurrence of a complication during the procedure (AOR, 1.958; 95% CI, [1.202-3.187]), and moderate to high maximum standardized uptake value on PET scan (AOR, 7.657; 95% CI, [1.737-33.763]). In 24 cases, a second TTNB was performed at the same target. The complication rate was 33%, and TTNB specimens provided diagnosis in 95% of cases with a 67% NPV.

CONCLUSIONS: One-half of all “negative” TTNB specimen results were falsely negative for malignant diagnosis. Findings in tissue collected from a second TTNB at the same target provided a final diagnosis in most cases without increasing complication rates. CHEST 2015; 148(2):472-480